Overview of Substance Use Disorders

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Professor of Community Health Sciences & Medicine
Richard Saitz Disclosures

• Alkermes provided medication for an NIH-supported study

The contents of this activity may include discussion of off label or investigative drug uses. The faculty is aware that is their responsibility to disclose this information.
Target Audience

• The overarching goal of PCSS-MAT is to make available the most effective medication treatments to serve patients in a variety of settings, including primary care, psychiatric care, and pain management settings.
Educational Objectives

At the conclusion of this activity participants should be able to:

- Identify the spectrum of substance use
- Describe neurobiological responses to substances
- Assess existing theories regarding substance use disorders
- Use accurate clinical terminology
- Describe the basic epidemiology and public health impact of the disorder
- List common comorbidities in people with substance use disorder
- Describe how chronic disease treatment applies to addiction
Outline

• Spectrum of unhealthy use
• Societal impact
• Neurobiology
• Theories of addiction
• Accurate terminology
• Epidemiology
• Comorbidity
• Chronic disease treatment
SPECTRUM OF SUBSTANCE USE
Unhealthy Use

Consumption
Heavy

Substance Use

Mild, moderate to severe
Harmful use
Risky use, at-risk hazardous

Unhealthy use

Consequences
Severe

Substance use disorders

Low-risk use

Abstinence

None

None

(modified from Saitz R, 2005)
Of 11, a minimum of 2-3 criteria is required for a mild substance use disorder diagnosis, 4-5 is moderate, and 6-7 is severe. The substance being used is specified.

1. Taking the substance in larger amounts and for longer than intended
2. Wanting to cut down or quit but not being able to do it
3. Spending a lot of time obtaining the substance
4. Craving or a strong desire to use substance

What is **craving**? A strong urge to use the substance, or such a strong desire to use that one couldn’t think of anything else. Time spent thinking about use. Difficulty resisting use.
5. Repeatedly unable to carry out major obligations at work, school, or home due to substance use
6. Continued use despite persistent or recurring social or interpersonal problems caused or made worse by substance use
7. Stopping or reducing important social, occupational, or recreational activities due to substance use
8. Recurrent use of the substance in physically hazardous situations
9. Consistent use of the substance despite acknowledgment of persistent or recurrent physical or psychological difficulties from using substances

(APA, 2013)
10. Tolerance as defined by either a need for markedly increased amounts to achieve intoxication or desired effect or markedly diminished effect with continued use of the same amount. In older adults: use of less but achieving the same effect (Does not apply for diminished effect when used appropriately under medical supervision).

11. Withdrawal: development of a characteristic syndrome due to cessation of or reduction in heavy and prolonged use, or the substance is used to avoid withdrawal (Does not apply when used appropriately under medical supervision).
SOCIETAL IMPACT
Employment

• Most people who use drugs are employed (70%)
• 10-20% of workplace deaths involve drugs
• Effects on productivity, absenteeism, injury
Partner Violence

- 2/3rds report perpetrator was drinking
Driving While Intoxicated

- 40% of traffic fatalities (alcohol)
- Marijuana most common drug detected in fatalities
State and Federal Prisoners

- ~80% report substance use ever, 70% weekly
- ~50% have substance use disorder
- 1/3 report using at the time of their offense
  - Crime while affected by drug use
  - Crime to fund drug purchase
  - Crime related to manufacture and sale
<table>
<thead>
<tr>
<th></th>
<th>Health Care</th>
<th>Overall</th>
<th>Year Estimate Based On</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>$168 billion</td>
<td>$300 billion</td>
<td>2010</td>
</tr>
<tr>
<td>Alcohol</td>
<td>$27 billion</td>
<td>$249 billion</td>
<td>2010</td>
</tr>
<tr>
<td>Illicit Drugs</td>
<td>$11 billion</td>
<td>$193 billion</td>
<td>2007</td>
</tr>
<tr>
<td>Prescription Opioids</td>
<td>$26 billion</td>
<td>$78.5 billion</td>
<td>2013</td>
</tr>
</tbody>
</table>
NEUROBIOLOGY
Neurobiology Involved in Addiction

The fine balance in connections that normally exists between brain areas active in reward, motivation, learning and memory, and inhibitory control becomes severely disrupted in addiction.

(Image: Compton, W. Addictions and Brain Reward System, NIDA presentation)
Drugs and Natural Rewards Elevate Dopamine Levels

Di Chiara et al., Neuroscience, 1999.

Natural Rewards Elevate DA Levels

**Food**

- NAc shell
- % of Basal DA Output vs. Time (min)
- Empty Box Feeding:
  - Time 0 to 60
  - Time 60 to 180

**Sex**

- DA Concentration (% Baseline) vs. Female Present
- Sample Number:
  - Sample 1 to 8

**AMPHETAMINE**

- Accumbens
- % of Basal Release vs. Time After Amphetamine
- DA, DOPAC, HVA

**MORPHINE**

- Accumbens
- % of Basal Release vs. Time After Morphine
- Dose (mg/kg): 0.5, 1.0, 2.5, 10

(Bassareo, 1999; Fiorino, 1997; Di Chiara 1988)
Repeated Drug Use *Changes the Brain*: Weakens the Brain Dopamine System

Repeated use of cocaine or other drugs reduces levels of dopamine D2 receptors

(Volkow, Fowler, Wang, Swanson & Telang, 2007)
Cocaine Craving: Population (controls, people who use cocaine) X Film (cocaine, erotic)

Signal Intensity (AU)

Cingulate

Ant Cing

IFG

(Garavan et al., 2000)
Effects of a Social Stressor on Dopamine Receptors and Propensity to Administer Drugs

Individually Housed

Becomes Dominant
No longer stressed

Group Housed

Becomes Subordinate
Stress remains

Social Setting Can Change Neurobiology

Social Support Is Correlated with D2/3 Receptor Binding


Standard Rat Housing

- Skinner Box isolated and can give foot shocks
- Rats given access to drugs use them to death
Rat Park
More Drug Use When Caged, Less Drug Use when Housed

(Alexander, 1978)
Narcotic Use in Southeast Asia and Afterward

An Interview Study of 898 Vietnam Returnees

Lee N. Robins, PhD; John E. Helzer, MD; Darlene H. Davis

Arch Gen Psychiatry—Vol 32, Aug 1975

From all US Army enlistees leaving Vietnam in September 1971, a random sample of 943 men was selected. Of these, 470 represented a “general” sample of all enlistees returning at that time, and 495 represented a “drug-positive” sample whose urine samples had been positive for opiates at the time of departure.
Table 1.—Drug Use Before, In, and After Vietnam*

<table>
<thead>
<tr>
<th>Drug Type</th>
<th>Before Vietnam, %</th>
<th>In Vietnam, %</th>
<th>Since Vietnam, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana, any</td>
<td>41</td>
<td>69†</td>
<td>45</td>
</tr>
<tr>
<td>Any drug: narcotics, amphetamines, barbiturates</td>
<td>30</td>
<td>45</td>
<td>23</td>
</tr>
<tr>
<td>Narcotics</td>
<td>11</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>Addiction to narcotics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By self-report</td>
<td>0.2</td>
<td>20</td>
<td>0.7</td>
</tr>
<tr>
<td>By symptoms of dependence‡</td>
<td>0.4</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>24</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>14</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>Combinations of drug types</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All 3: narcotics, amphetamines, barbiturates</td>
<td>4</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Amphetamines &amp; barbiturates</td>
<td>5</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Narcotics &amp; amphetamines</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Narcotics &amp; barbiturates</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Narcotics only</td>
<td>2</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Amphetamines only</td>
<td>11</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Barbiturates only</td>
<td>2</td>
<td>...§</td>
<td>2</td>
</tr>
</tbody>
</table>

* Data from the interviewed general sample (N = 451).
† Estimate based on assumption that those who used marijuana before continued in Vietnam.
‡ Criteria given on p 957.
§ Less than 0.5%.

Men With Narcotic Experience Before Vietnam (N=106)

- General Sample, N=90
- Drug-Positive Sample, N=341
- 122 NARA patients 6 mo after release to aftercare

Narcotic use in eight to ten months after Vietnam by men first addicted in Vietnam. Narcotic Addict Rehabilitation Act indicated by NARA.
THEORIES OF ADDICTION
Theory of Neurobiology

- Key components that drive compulsive drug use:
  - Dopamine release leads to subjective feelings of pleasure/reward and reduction in feelings of stress (NAcc)
  - Repeated use overrides impulse inhibition (dorsal striatal circuit)
  - Repeated use is also associated with discomfort when stopped which leads to more use: withdrawal and mood dysregulation (amygdala)
  - Dysregulation of executive function (Preoccupation/anticipation: prefrontal)
Conceptual Models

- Choice (disordered)
- Impulse and self-control
- Learning and habit
- Some synthesis?
  - A chronic condition of the motivational system with an abnormally high priority given to a particular activity
    - System is abnormal due to drug or other behavior
      - Sensitization, tolerance, withdrawal, mood, social effects
      - Other factors (anxiety, depression, low self-esteem, impulse control)
    - Affected by environment on a normal system that is stressed (distressing circumstances, fame, social relationships)
A Disease?

- A disorder of structure or function that produces specific signs or symptoms
- Addiction has defined causes (genetics, environment) and observable consequences (behavioral, biological)
A difference, perhaps, vs other diseases

- High negative externalities
  - Perpetrate violence, crimes, harmful behavior
  - Not all
  - Like a chronic infectious disease?

(Humphreys, 2017)
Addiction as a *Chronic* Disease

- Comparison to chronic conditions like depression, type 2 diabetes, hypertension, and asthma
  - Similar treatment adherence and relapse rates
  - Results from voluntary behavior
  - Difficult to manage behaviorally
  - May be caused in part by genetic factors
  - Responds to ongoing treatment
  - Some will have to engage in lifelong management of the condition

(McLellan, 2000)
Evaluating Treatment of Hypertension vs. Addiction

(McLellan, 2002)
ACCURATE CLINICAL TERMINOLOGY
Terminology

• Unhealthy use
  ▪ Harmful, hazardous
• Binge
  ▪ Heavy episode
  ▪ Multiple days
• Disorder
• Dependence
  ▪ Physical
  ▪ Addiction
  ▪ ICD, DSM IV and prior

• Misuse
  ▪ Spectrum vs. narrow
• Return to use
  ▪ Recurrence
  ▪ Remission
  ▪ Relapse
• Medication
  ▪ Substitution
  ▪ Assisted
  ▪ Replacement
• Neonatal withdrawal
  ▪ Abstinence syndrome
  ▪ Addicted
Numbers of People Aged 12 or Older with a Past Year Substance Use Disorder: 2015

No Past Year Substance Use Disorder: 246.9 Million People (92.2%)
Past Year Substance Use Disorder: 20.8 Million People (7.8%)

- Alcohol: 15.7 Million People
- Illicit Drugs: 7.7 Million People
- Marijuana: 4.0 Million People
- Misuse of Prescription Pain Relievers: 2.0 Million People
- Cocaine: 0.9 Million People
- Methamphetamine: 0.9 Million People
- Heroin: 0.6 Million People
- Misuse of Prescription Stimulants: 0.4 Million People

Note: Estimated numbers of people refer to people aged 12 or older in the civilian, noninstitutionalized population in the United States. The numbers do not sum to the total population of the United States because the population for NSDUH does not include people aged 11 years old or younger, people with no fixed household address (e.g., homeless or transient people not in shelters), active-duty military personnel, and residents of institutional group quarters, such as correctional facilities, nursing homes, mental institutions, and long-term care hospitals.

Note: The estimated numbers of people with substance use disorders are not mutually exclusive because people could have use disorders for more than one substance.

(SAMHSA, 2016)
Prevalence of disorder, adults (US)

- Drug use disorder (all addictive drugs)- 3.9%*
- Alcohol Use Disorder- 13.9%*
- Opioid Use Disorder- 0.8%**
  - Nonmedical Prescription Opioid Use Disorder- 0.7%
    - (Misuse 4.1%)
  - Heroin Use Disorder- 0.3%

*NESARC III 2013 DSM5
**NSDUH 2016 DSMIV
(Grant, 2015; SAMHSA, 2016)
# Prevalence of Drug Use Disorder by Socioeconomic Status

(Compton, 2007)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Past 12-month prevalence of drug use disorder (%) (n=777)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2</td>
</tr>
<tr>
<td>Male</td>
<td>2.8</td>
</tr>
<tr>
<td>Female</td>
<td>1.2</td>
</tr>
<tr>
<td>White</td>
<td>1.9</td>
</tr>
<tr>
<td>Black</td>
<td>2.4</td>
</tr>
<tr>
<td>Native American</td>
<td>4.9</td>
</tr>
<tr>
<td>Asian</td>
<td>1.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.7</td>
</tr>
<tr>
<td>18-29 years old</td>
<td>5.3</td>
</tr>
<tr>
<td>30-44</td>
<td>1.9</td>
</tr>
<tr>
<td>45-64</td>
<td>0.8</td>
</tr>
<tr>
<td>&gt;65</td>
<td>0.2</td>
</tr>
<tr>
<td>Married</td>
<td>1.0</td>
</tr>
<tr>
<td>Widowed, separated, divorced</td>
<td>1.7</td>
</tr>
<tr>
<td>Never married</td>
<td>5.2</td>
</tr>
</tbody>
</table>
Prevalence of Drug Use Disorder by Socioeconomic Status (continued)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Past 12-month prevalence of drug use disorder (%) (n=777)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;High school</td>
<td>2.3</td>
</tr>
<tr>
<td>High school</td>
<td>2.4</td>
</tr>
<tr>
<td>&gt;Some college</td>
<td>1.7</td>
</tr>
<tr>
<td>$0-19,999 annual income</td>
<td></td>
</tr>
<tr>
<td>$20,000-34,999</td>
<td>2.8</td>
</tr>
<tr>
<td>$35,000-69,999</td>
<td>1.9</td>
</tr>
<tr>
<td>$70,000 &amp; over</td>
<td>0.7</td>
</tr>
<tr>
<td>Urban</td>
<td>2.0</td>
</tr>
<tr>
<td>Rural</td>
<td>1.9</td>
</tr>
<tr>
<td>Northeast</td>
<td>2.1</td>
</tr>
<tr>
<td>Midwest</td>
<td>2.0</td>
</tr>
<tr>
<td>South</td>
<td>1.5</td>
</tr>
<tr>
<td>West</td>
<td>2.7</td>
</tr>
</tbody>
</table>
Demographics of OUD

- **Age/Sex**
  - Males younger than 45 have higher rates than women
  - Women 45 and older have higher rates than men
- **Race/Ethnicity**
  - More in whites than African Americans
  - Increasing in Hispanics
- **Income**
  - Higher rates for lower income
- **Employment (SUD)**
  - Higher rates for unemployed, uninsured
    - BUT, over half of those with substance use disorder are employed full-time

(BlueCross BlueShield, 2017; Compton, 2000; Becker, 2008)
Risk and Protective Factors

![Graph showing hazard rate by age for Drug Abuse and Drug Dependence.]

- Environment plays a significant role in addiction.
- Genetics account for 50-75% of addiction.
Risk and Protective Factors

- From observational studies, so causality and mediation/moderation always remain issues
- Example: Age of onset

97% < 21

Developmental Risks

• Early: temperament, attachment, parenting warmth, stability
• Middle school: Self-control, aggression, permissive parenting, low parental aspirations for child, parental use attitudes, peers, school failure
• Adolescence: academic mastery, school engagement, parental supervision, peers
• Young adulthood: adult role, leaving home, college, peers
Biological Risks

• Genetic factors: twin studies as well as study of specific genes
  ▪ NICOTINE: fast metabolism (CYP2A6)—smoke more cigarettes, progress to addiction, more severe withdrawal, harder to quit
  ▪ ALCOHOL
    – Genetic, biological low response=higher risk
    – Flushing response to alcohol
Psychological Risks

- Depression, anxiety, psychotic disorders
- Conduct disorder, ADHD
- Stress, trauma/abuse, PTSD
- Risk-taking or impulsive personality traits, low self-esteem (use)
- Expectancies (positive)
Environmental Risks

• Access to addictive substances
  ▪ Liquor cabinet, sales outlets, medical marijuana, prescription opioids
• Substance use in the family (parental use); Parental anti-use messages and expectations
• Peer influence (use and approval of use), community tolerance and “rite of passage”
• Lax enforcement; glamorous advertising, media or DTC for Rx drugs
• High levels of parent-child conflict, poor communication, weak family bonds
ASSOCIATION WITH OTHER CONDITIONS
Addiction

Other MH

3 CCCs

Medical
## Medical and Psychiatric Conditions Associated with Addiction

### Conditional Logistic Regression Results for Each Medical Diagnosis in the Prior Year, Full Sample of Cases (n = 747) vs Controls (n = 3690)

<table>
<thead>
<tr>
<th>Medical Disorder</th>
<th>% Diagnosed</th>
<th>Odds Ratio (95% Confidence Interval)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cases</strong></td>
<td><strong>Controls</strong></td>
<td><strong>95%</strong></td>
<td><strong>P</strong></td>
</tr>
<tr>
<td>Acid-related disorder</td>
<td>5.49</td>
<td>2.78 (1.87-4.11)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Arthritis</td>
<td>3.88</td>
<td>2.97 (1.83-4.82)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Asthma</td>
<td>6.83</td>
<td>2.83 (1.98-4.03)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Benign conditions of the uterus</td>
<td>5.35</td>
<td>1.34 (0.93-1.93)</td>
<td>.12</td>
</tr>
<tr>
<td>Benign prostatic hyperplasia</td>
<td>0.13</td>
<td>0.83 (0.10-6.92)</td>
<td>.87</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>0.13</td>
<td>0.50 (0.06-3.91)</td>
<td>.51</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>0.27</td>
<td>1.39 (0.29-6.70)</td>
<td>.68</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>0.27</td>
<td>5.00 (0.70-35.50)</td>
<td>.11</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>0.67</td>
<td>4.89 (1.42-16.90)</td>
<td>.01</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>0.00</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.47</td>
<td>0.80 (0.42-1.52)</td>
<td>.49</td>
</tr>
<tr>
<td>Headache</td>
<td>9.24</td>
<td>2.56 (1.89-3.46)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Hypertension</td>
<td>7.23</td>
<td>2.29 (1.62-3.23)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>0.94</td>
<td>2.11 (0.85-5.21)</td>
<td>.11</td>
</tr>
<tr>
<td>Lower back pain</td>
<td>11.24</td>
<td>2.07 (1.59-2.70)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>0.00</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0.94</td>
<td>1.86 (0.78-4.48)</td>
<td>.16</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>0.00</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Renal failure</td>
<td>0.13</td>
<td>1.00 (0.12-8.56)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Injuries/overdoses</td>
<td>25.57</td>
<td>2.47 (2.03-2.99)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Depression</td>
<td>28.51</td>
<td>14.91 (11.25-19.75)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Anxiety disorder</td>
<td>16.87</td>
<td>8.87 (6.58-11.97)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Major psychosis</td>
<td>6.56</td>
<td>18.64 (10.11-34.36)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Liver cirrhoses</td>
<td>0.67</td>
<td>12.50 (2.43-64.43)</td>
<td>.003</td>
</tr>
<tr>
<td>Diseases of the pancreas</td>
<td>0.40</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Alcoholic gastritis</td>
<td>0.27</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Toxic effect of alcohol, ethyl</td>
<td>0.27</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Toxic effect of alcohol, unspecified</td>
<td>0.13</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Alcoholic neuropathy</td>
<td>0.00</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Alcoholic cardiomyopathy</td>
<td>0.00</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Excessive blood alcohol level</td>
<td>0.00</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Poisoning by alcohol</td>
<td>0.00</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Perinatal alcohol and drug dependence</td>
<td>0.00</td>
<td>&gt;.99</td>
<td></td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>0.67</td>
<td>4.17 (1.27-13.65)</td>
<td>.02</td>
</tr>
</tbody>
</table>

*Because of a zero prevalence among cases or controls, conditional logistic regression was not calculated. The P value was calculated using the Fisher exact test.*

(Mertens, 2003)
### Adjusted for Demographics and Other Psychiatric Disorders

<table>
<thead>
<tr>
<th>Comorbid Disorder</th>
<th>Drug Use Disorder</th>
<th>Drug Abuse</th>
<th>Drug Dependence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol use disorder</td>
<td>7.1 (6.1-8.2)</td>
<td>6.0 (5.1-7.1)</td>
<td>7.3 (5.4-10.0)</td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td>5.4 (4.6-6.4)</td>
<td>5.5 (4.6-6.6)</td>
<td>3.6 (2.6-5.1)</td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td>9.8 (8.3-11.5)</td>
<td>6.9 (5.6-8.4)</td>
<td>11.5 (8.1-16.3)</td>
</tr>
<tr>
<td>Nicotine dependence</td>
<td>2.9 (2.5-3.4)</td>
<td>2.1 (1.8-2.4)</td>
<td>4.1 (3.2-5.3)</td>
</tr>
<tr>
<td>Any mood disorder</td>
<td>1.7 (1.5-2.0)</td>
<td>1.3 (1.1-1.5)</td>
<td>2.4 (1.8-3.2)</td>
</tr>
<tr>
<td>Major depressive disorder</td>
<td>1.3 (1.1-1.6)</td>
<td>1.3 (1.1-1.6)</td>
<td>1.5 (1.1-1.9)</td>
</tr>
<tr>
<td>Bipolar I disorder</td>
<td>2.4 (1.9-3.0)</td>
<td>1.3 (1.0-1.8)</td>
<td>3.2 (2.3-4.6)</td>
</tr>
<tr>
<td>Bipolar II disorder</td>
<td>1.3 (0.9-1.9)</td>
<td>0.8 (0.5-1.3)</td>
<td>2.6 (1.5-4.3)</td>
</tr>
<tr>
<td>Dysthymia</td>
<td>1.4 (1.1-1.8)</td>
<td>1.2 (0.9-1.7)</td>
<td>1.7 (1.2-2.5)</td>
</tr>
<tr>
<td>Any anxiety disorder</td>
<td>1.2 (1.1-1.4)</td>
<td>1.0 (0.8-1.2)</td>
<td>1.7 (1.3-2.2)</td>
</tr>
<tr>
<td>Any panic disorder</td>
<td>1.6 (1.2-2.0)</td>
<td>1.1 (0.8-1.4)</td>
<td>2.0 (1.4-2.9)</td>
</tr>
<tr>
<td>Panic with agoraphobia</td>
<td>1.9 (1.2-3.1)</td>
<td>1.0 (0.6-1.7)</td>
<td>2.4 (1.3-4.3)</td>
</tr>
<tr>
<td>Panic without agoraphobia</td>
<td>1.4 (1.1-1.8)</td>
<td>1.1 (0.8-1.4)</td>
<td>1.6 (1.2-2.3)</td>
</tr>
<tr>
<td>Social phobia</td>
<td>1.1 (0.9-1.4)</td>
<td>0.9 (0.7-1.2)</td>
<td>1.3 (0.9-1.9)</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>1.1 (0.9-1.3)</td>
<td>1.0 (0.8-1.2)</td>
<td>1.3 (0.9-1.7)</td>
</tr>
<tr>
<td>Generalized anxiety</td>
<td>1.1 (0.9-1.5)</td>
<td>0.9 (0.6-1.2)</td>
<td>1.6 (1.1-2.2)</td>
</tr>
<tr>
<td>Any personality disorder</td>
<td>1.8 (1.5-2.1)</td>
<td>1.3 (1.1-1.6)</td>
<td>2.4 (1.9-3.1)</td>
</tr>
<tr>
<td>Avoidant</td>
<td>1.4 (1.1-1.9)</td>
<td>1.1 (0.8-1.5)</td>
<td>1.5 (1.0-2.3)</td>
</tr>
<tr>
<td>Dependent</td>
<td>1.2 (0.6-2.6)</td>
<td>0.5 (0.2-1.3)</td>
<td>1.8 (0.8-4.3)</td>
</tr>
<tr>
<td>Obsessive-compulsive</td>
<td>0.9 (0.7-1.1)</td>
<td>0.8 (0.6-1.0)</td>
<td>1.1 (0.8-1.5)</td>
</tr>
<tr>
<td>Paranoid</td>
<td>1.0 (0.7-1.2)</td>
<td><strong>0.7</strong> (0.5-1.0)</td>
<td>1.2 (0.9-1.7)</td>
</tr>
<tr>
<td>Schizoid</td>
<td>1.3 (0.9-1.7)</td>
<td>1.1 (0.8-1.5)</td>
<td>1.3 (0.9-1.9)</td>
</tr>
<tr>
<td>Histrionic</td>
<td>1.0 (0.7-1.4)</td>
<td><strong>0.7</strong> (0.4-1.0)</td>
<td>1.5 (1.0-2.1)</td>
</tr>
<tr>
<td>Antisocial</td>
<td><strong>3.0</strong> (2.4-3.9)</td>
<td><strong>1.6</strong> (1.2-2.1)</td>
<td><strong>3.1</strong> (2.3-4.2)</td>
</tr>
</tbody>
</table>

(Mertens, 2003)
Association Between Addiction, Other Mental Health Disorders, and Medical Conditions

• Alcohol and drug use (both) disorders with each other
• Both with mood disorders, anxiety disorders, personality disorders
• Both with an array of medical conditions and symptoms
  ▪ Diabetes, asthma, skin infections, gastrointestinal, neoplasms
  ▪ Pain-related (arthritis, headache, back pain)

(Dickey, Normand, Weiss, Drake & Azeni, 2002; Mertens, Lu, Parthasarathy, Moore, Weisner, 2003; Compton, Thomas, Stinson, Grant, 2007; Grant et al, 2006)
Mechanisms of Harmful Drug Effects

- Direct, due to desired effects
  - Intoxication/overdose, withdrawal
- Direct, due to undesired effects, contaminants
  - Lung cancer, cirrhosis, talc lung, medication interaction
- Indirect, due to method of administration
  - Endocarditis, pneumothorax, HIV
- Indirect, due to associated behavior
  - Sexually transmitted diseases, assault/injury, motor vehicle crash, HIV
Injection

- Bad veins
- Endocarditis, septic phlebitis
- Hepatitis A, B, C, delta
- HIV, other STDs
- Cellulitis, septic arthritis, pneumonia, osteomyelitis, epidural abscess, skin abscess, mycotic aneurysm, malaria, tetanus
- Pulmonary hypertension, talc granulomatosis, septic emboli, pulmonary embolism (including needle), pneumothorax, hepatic granulomatosis
- Kidney failure, amyloidosis
Hepatitis C and HIV

- **HCV**
  - 1/3rd of young (18–30) PWID have HCV
  - Older and former: 70%–90%

- **HIV**
  - 11% prevalence among PWID
  - 9% attributable risk among PWID

(Spiller, Broz, Weinert, Nerlander & Paz-Bailey, 2015; CDC, 2017)
CHRONIC DISEASE TREATMENT
Addiction CAN Be Treated
Brain Function CAN Recover

Partial Recovery of Dopamine Transporters in People Who Use Methamphetamine (METH) After Protracted Abstinence

Normal Control
(1 Person who uses METH month drug-free)
Person who uses METH (14 months abstinence)

(Volkow et al, 2001)
For more severely addicted individuals …

Course of SUD and achievement of stable recovery can take a long time …

Opportunity for earlier detection through screening in non-specialty settings like primary care/ED

Addiction Onset

Help Seeking

4-5 years

Self-initiated cessation attempts

4-5 Treatment episodes/mutual-help

8 years

Full Sustained Remission (1 year abstinent)

5 years

Continuing care/mutual-help

Relapse Risk drops below 15%

>50% of individuals with addiction will achieve full sustained remission (White, 2013)

Source/Courtesy of Professor John Kelly
10-10-50-50
INTEGRATION
• Weisner C et al. JAMA 2001;286:1715-23
Original Investigation

Chronic Care Management for Dependence on Alcohol and Other Drugs
The AHEAD Randomized Trial

Richard Saitz, MD, MPH; Debbie M. Cheng, ScD; Michael Winter, MPH; Theresa W. Kim, MD; Seville M. Meli, MPH; Don Allensworth-Davies, PhD, MSc; Christine A. Lloyd-Travaglini, MPH; Jeffrey H. Samet, MD, MA, MPH

**IMPORTANCE** People with substance dependence have health consequences, high health care utilization, and frequent comorbidity but often receive poor-quality care. Chronic care management (CCM) has been proposed as an approach to improve care and outcomes.

**OBJECTIVE** To determine whether CCM for alcohol and other drug dependence improves substance use outcomes compared with usual primary care.

**DESIGN, SETTING, AND PARTICIPANTS** The AHEAD study, a randomized trial conducted among 563 people with alcohol and other drug dependence at a Boston, Massachusetts, hospital-based primary care practice. Participants were recruited from September 2006 to September 2008 from a freestanding residential detoxification unit and referrals from an urban teaching hospital and advertisements; 95% completed 12-month follow-up.

(Saitz, et al, 2013)
Table 2. Effects of Chronic Care Management Intervention for Substance Dependence on Favorable Addiction Status, Substance Use Problems, Health-Related Quality of Life, and Acute Health Care Utilization

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Baseline</th>
<th>12-Month Follow-up</th>
<th>Measure (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>All Participants</td>
<td>n=282</td>
<td>n=281</td>
<td>n=270</td>
<td>n=262</td>
</tr>
<tr>
<td>Abstinence from stimulants, opioids, and heavy</td>
<td>NA</td>
<td>NA</td>
<td>120 (44)</td>
<td>109 (42)</td>
</tr>
<tr>
<td>drinking, past 30 d</td>
<td></td>
<td></td>
<td>(0.65 to 1.10)</td>
<td></td>
</tr>
<tr>
<td>Abstinence from stimulants, opioids, and any</td>
<td>NA</td>
<td>NA</td>
<td>109 (40)</td>
<td>95 (36)</td>
</tr>
<tr>
<td>drinking, past 30 d</td>
<td></td>
<td></td>
<td>(0.68 to 1.17)</td>
<td></td>
</tr>
<tr>
<td>ASI alcohol score &gt;0.4e</td>
<td>170 (60)</td>
<td>175 (63)</td>
<td>53 (20)</td>
<td>58 (22)</td>
</tr>
<tr>
<td>ASI drug score &gt;0.2g</td>
<td>205 (73)</td>
<td>208 (74)</td>
<td>58 (21)</td>
<td>54 (21)</td>
</tr>
<tr>
<td>Mental health-related quality of life (MCS score),</td>
<td>30.8 (29.7-31.9)</td>
<td>30.0 (28.8-31.2)</td>
<td>39.4 (38.3-40.5)</td>
<td>39.1</td>
</tr>
<tr>
<td>mean (95% CI)</td>
<td></td>
<td></td>
<td>(37.9-40.3)</td>
<td></td>
</tr>
<tr>
<td>Physical health-related quality of life (PCS score),</td>
<td>41.4 (40.4-42.4)</td>
<td>42.0 (41.0-42.9)</td>
<td>43.1 (42.2-44.0)</td>
<td>42.4</td>
</tr>
<tr>
<td>mean (95% CI)</td>
<td></td>
<td></td>
<td>(41.5-43.4)</td>
<td></td>
</tr>
<tr>
<td>Any nights in hospital (medical, psychological,</td>
<td>76 (27)</td>
<td>84 (30)</td>
<td>46 (17)</td>
<td>39 (15)</td>
</tr>
<tr>
<td>detoxification), past 3 mo</td>
<td></td>
<td></td>
<td>(0.78 to 1.46)</td>
<td></td>
</tr>
<tr>
<td>Any days in emergency department, past 3 mo</td>
<td>146 (52)</td>
<td>158 (56)</td>
<td>81 (30)</td>
<td>80 (31)</td>
</tr>
</tbody>
</table>

(Saitz, et al, 2013)
Choosing Healthier Drinking Options in Primary Care (CHOICE) Trial

- Patients with high risk unhealthy use or alcohol use disorders (73%)
- Nurse care management for 1 year
- Results:
  - more use of alcohol use disorder medications (32% vs 8%)
  - no differences in specialty alcohol treatment or mutual help
  - no difference in % heavy drinking days (35% and 39%)
  - no difference good drinking outcome (20% and 15%)

(Bradley KA et al, 2017)
Integrating Care

O'Malley SS et al. Arch Intern Med 2003;163:1695 - 1704. CBT v PCM w/NTX >> similar outcomes

Osln et al. J Gen Intern Med 2014 3 VAs--MM w/NTX vs. Specialty care >> better engagement, less heavy drinking


• Referred
• Collaborative care-training and care coordinators
• Any OUD/AUD treatment (brief evidence-based therapy, bup, injectable NTX) (39% v. 17%)
• Abstinence from opioids or alcohol at 6 months (33% v. 22%)
Initiating Care

Original Investigation

Emergency Department-Initiated Buprenorphine/Naloxone Treatment for Opioid Dependence
A Randomized Clinical Trial

Gail D’Onofrio, MD, MS; Patrick G. O’Connor, MD, MPH; Michael V. Pantalon, PhD; Marek C. Chawarski, PhD;
Susan H. Busch, PhD; Patricia H. Owens, MS; Steven L. Bernstein, MD; David A. Fiellin, MD

- Engagement in addiction RX
- Days of opioid use from
  (no diff in Utox…)

Bup v. referral v. BI
78% v. 37% v. 45%
~5 to 1 v. 2 v. 2

(D’Onofrio, et. al, 2015)
Conclusion

- Substance use varies—individuals can have low-risk use, risky or hazardous use, or harmful use that can meet DSM 5 criteria for a disorder
- Substances work on many areas of the brain, including reward and pain pathways and dopamine systems
- There exist many theories behind addiction—most likely etiologies are combined -- an abnormal motivational system, neurobiology, and environmental factors
- Accurate language is important to use
- Substance use disorders are associated with a range of mental health disorders and medical conditions
- More evidence is needed on the benefits of chronic care management for substance use disorders but integrated care is likely advantageous
References

References


References


References

• McLellan, AT., Lewis, DC., O'brien, CP., & Kleber, HD. (2000). Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. Jama, 284(13), 1689-1695.


• SAMHSA. (2016). 2015 Key Substance Use and Mental Health Indicators report: Results from the 2015 National Survey on Drug Use and Health. Substance Abuse and Mental Health Services Administration website.

References


• https://pixabay.com/en/photos/puzzle%20piece/
PCSS Mentor Program

- PCSS Mentor Program is designed to offer general information to clinicians about evidence-based clinical practices in prescribing medications for opioid addiction.

- PCSS mentors are a national network of providers with expertise in addictions, pain, evidence-based treatment including medication-assisted treatment.

- 3-tiered approach allows every mentor/mentee relationship to be unique and catered to the specific needs of the mentee.

- No cost.

For more information visit: pcssNOW.org/mentoring
PCSS Discussion Forum

Have a clinical question?

Ask a Colleague
A simple and direct way to receive an answer related to medication-assisted treatment. Designed to provide a prompt response to simple practice-related questions.

Ask Now
PCSS-MAT is a collaborative effort led by the American Academy of Addiction Psychiatry (AAAP) in partnership with the: Addiction Technology Transfer Center (ATTC); American Academy of Family Physicians (AAFP); American Academy of Neurology (AAN); American Academy of Pain Medicine (AAPM); American Academy of Pediatrics (AAP); American College of Emergency Physicians (ACEP); American College of Physicians (ACP); American Dental Association (ADA); American Medical Association (AMA); American Osteopathic Academy of Addiction Medicine (AOAAM); American Psychiatric Association (APA); American Psychiatric Nurses Association (APNA); American Society of Addiction Medicine (ASAM); American Society for Pain Management Nursing (ASPMN); Association for Medical Education and Research in Substance Abuse (AMERSA); International Nurses Society on Addictions (IntNSA); National Association of Community Health Centers (NACHC); National Association of Drug Court Professionals (NADCP), and the Southeast Consortium for Substance Abuse Training (SECSAT).

For more information: www.pcssNOW.org

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www.facebook.com/pcssprojects/

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